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ABSTRACT

The study attempted to determine the relative accuracy with which 290 college students anticipated the responses of a group of 65 educable mentally retarded (EMR) males (11- to 14-years-old) and a group of 66 normal children (10- to 14-years-old). College students were asked to predict responses to EMR and normal children to questions designed to emphasize cognitive processes rather than academic skills. Anticipations were analyzed according to the students' sex, academic major, age, hours in special education courses, and experience with EMR children. Data, shown in tables which provide detailed statistical analyses, indicated that all groups of college students anticipated the nonretarded children's responses at a reasonable level of accuracy (mean of 13.2 correct answers out of a possible 24), but that none of the groups correctly anticipated responses of EMR Ss at any level of proficiency (mean of 5.5 correct answers out of 24). However, special education majors, students in special education courses, students who had had experience with EMR children, oldest students, and females were better than their counterparts in anticipating responses of the EMR group. Appendixes provide questions used in preparing the normative data base, tables that indicate responses of the EMR and the nonretarded groups, instructions to the college students, and correlation matrices. (LH)

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ANTICIPATION OF COGNITIVE BEHAVIOR OF MENTALLY RETARDED AND NONRETARDED CHILDREN

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Foreword

Introductory courses in special education are offered to students year after year. Most of these offerings purport to develop a better "understanding" of the handicapped child. Introductory courses in the field of mental retardation, for example, offer college students an opportunity to acquire knowledge about the condition so as to understand better children who are characterized by the set of variables which defines the mentally retarded population. Textbooks, articles, and lectures are frequently used to meet this objective. College texts and lectures frequently refer to short attention span, short-term memory deficits, poor abstract ability, etc., but not all mentally retarded pupils reveal these deficits in their educational functioning. Hence, traditional methods of deriving an understanding of the mentally retarded population frequently lead to generalizations with questionable external validity when teacher trainees subsequently test them against their direct experiences with children labeled mentally retarded in the public schools. It is obvious that knowledge of retarded children consists of more than academic understanding of mean or modal functioning levels of the population. Understanding the quantitative and qualitative range of variability of functioning among members of the population probably leads to a more functional translation of knowledge into effective teaching behaviors.

If we are to improve initial course offerings in the field of mental retardation it appears necessary to evolve an operational definition of the concept "understanding the retarded child." For a teacher,

understanding of a retarded child is manifested in the ability to anticipate the child's behavior in domains relevant to the curriculum. Hence, when the teacher prepares to interact with a handicapped child he must anticipate the child's reactions to the materials, content level, method of presentation, etc., to determine the appropriateness of the planned interaction. When directly interacting with the child, the teacher must constantly monitor responses, draw upon his memory of the child's previous response tendencies, anticipate responses, and adjust his behavior in accordance with desired pupil outcomes. The extent to which teachers can accurately anticipate pupil behaviors within specific curriculum contexts appears to be a reasonable criterion for assessing the teacher's understanding of the child. The criterion appears equally valid when applied to anticipations of the modal responses of defined groups of mentally handicapped children.

In this initial study of the Anticipation Project, an attempt is made to determine how accurately different college student groups anticipate responses of a group of educable mentally retarded and nonretarded children, respectively. The study seeks to relate differences in anticipation accuracy to specific anticipator characteristics. The study explores the extent to which these different groups of college level students "understand" retarded and nonretarded children within the context of the domains sampled through the items used.

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Abstract

The construct of anticipation involves the use of a previously formed concept to deduce characteristics of events which could occur. This study was designed to determine how accurately selected groups of adults, including many future teachers, could anticipate which responses to a set of questions EMR and nonretarded children were most likely to give. The children's responses to these questions were obtained from normative data. Special education majors, students in special education courses, students with previous experience with EMR children, oldest students, and females were better anticipators of EMR responses than were their counterparts; no differences were found for nonretarded children's responses.

Anticipation of Cognitive Behavior of Mentally Retarded and Nonretarded Children

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The construct of anticipation involves the use of a previously formed concept to deduce characteristics of an event which could occur. The concept itself results from induction based on past experience with or knowledge about similar events, and the anticipation can result in a deductive prediction concerning these events if they occur again. The notion of anticipation is an extension of personal construct (Kelly, 1955), cognitive dissonance (Festinger, 1961), and attribution (de Charms, 1968) theories.

George Kelly, the major personal construct theorist, implies the use of the construct of anticipation when he describes ". . . man's continual attempt to predict and control the events he experiences [Maddi, 1968, p. 112]." He states that man's behavior patterns and thought processes are channeled by the way he anticipates events (Kelly, 1955). His theory emphasizes each individual's personal constructs: how he personally perceives and anticipates events (Bannister, 1970).

Cognitive dissonance theorists include Leon Festinger and David McClelland, among others. Festinger's position is similar to Kelly's in several ways, although he uses the term "cognition" in place of Kelly's use of "construct." Specific expectations, or anticipations, are formed based on these cognitions (Festinger, 1961).

McClelland also uses the notion of anticipation, although he uses the term "expectancy" rather than either "cognition" or "construct" (Maddi, 1968). Again a central notion is that a person uses his expectancies to anticipate future events.

Attribution theory has been defined as the use of a general concept to explain specific instances of behavior (de Charms, 1968). Obviously, the three positions discussed above could be, and often are, classified as attribution theories. Again, anticipation relates general concepts to predictions of future events based on these concepts.

Research studies in this area are of two main types: those concerned with the result of different expectancies on subjects or students and those involved with actual teacher prediction of student performance. Of the former, the most widely cited work is that presented in Pygmalion in the Classroom by R. Rosenthal and L. Jacobson (1968). Although this work has been questioned on methodological grounds (Elashoff & Snow, 1971; Jose, 1970; Snow, 1969; Thorndike, 1968), its major assertion is that differential expectations of the teacher (or experimenter) result in corresponding differential treatment of the students (or subjects), which in turn results in differential behaviors by the students that reinforce the teacher's original expectations--the self-fulfilling prophecy. Rosenthal's work has led to a number of studies of experimenter-expectancy effects, or self-fulfilling prophecy. Brophy and Good (1970) and Minor (1970) concluded that experimenter-expectancy effects do exist, although other variables such as sex of subject and concern of the subjects with their performances influence the extent to which self-fulfilling prophecy affects the results.

Studies concerned with teacher prediction of pupil performance date back several decades. Some of these have concluded that teachers cannot predict future student performance as well as standardized tests can (Lee, Clark, & Lee, 1934), while others have reached the opposite conclusion (Carr & Michaels, 1941). Finley (1966) indicated that contradictory results often occur because of the criterion test measures used. He used three different standardized tests as criterion measures to compare against the teachers' ratings. His results indicated that opposing conclusions would be reached depending on which of the three tests was used as the criterion.

The present study develops the use of the construct of anticipation in exploring what various groups of college students know about nonretarded and retarded children's cognitive behavior. The major purpose was to determine whether special education students manifest a differential ability to anticipate correctly educable mentally retarded (EMR) children's responses when compared to other student populations. The study also investigated whether such variables as student age, undergraduate major, sex, hours in special education, and experience with retarded children are related to the students' abilities to anticipate correctly the responses of both nonretarded and retarded children. In addition, students' abilities to anticipate accurately those instances where identical responses were given by both EMR and nonretarded children were explored.

The ability to anticipate cognitive responses of EMR children appears to depend upon an individual's ability to discriminate between EMR and nonretarded responses in situations where differences between the two groups of children are likely to occur. Conversely, accurate

anticipation would also be a function of the ability of an individual to recognize the situations or, in this case, questions to which EMR and nonretarded children would not respond differently.

In asking groups of college students to make a choice of what they believe are the most likely responses of most EMR children and regular class children, they are, in fact, being asked to respond by anticipating some presumed group norm. Essentially it was inferred that a high degree of accuracy in judging the most frequent response given by a group of children reflects knowledge of the norm. In the present study, the investigation is limited to an exploration of the ability of various groups of college students to anticipate the most probable responses given by a group of children who are defined by age, socioeconomic status, and school placement.

PHASE I--NORMATIVE DATA BASE

In the initial phase of the present study, a group of children classified as EMR and a group of nonretarded children were asked to respond to a set of questions. The purpose of this test was to determine the frequency of occurrence of any response to a given question. The test items and resulting set of responses were collected in order to prepare a data base for the construction of a test to determine whether or not selected groups of adults can accurately anticipate which responses EMR and nonretarded children are most likely to give.

Method

Subjects

The nonretarded population tested consisted of 66 10- to 14-year-olds from lower and lower-middle socioeconomic class backgrounds. Fifty of

those tested were male, and sixteen were female. Only four of the total population were black. Intelligence quotients ranged from 90 to 116. The Whitmore Lake Junior High School and the St. Boniface Elementary School of Detroit provided the nonretarded population tested.

The educable mentally retarded population was drawn from the Wayne County Child Development Center in Plymouth, Michigan. A total of 65 male children between the ages of 11 and 14, most of whom were from the lower socioeconomic strata, were tested. Twenty-five of the children were black and twenty-four were white; no breakdown of the remaining sixteen is available. Intelligence quotients ranged from 60 to 89.

Of all those tested in both populations, none had known sensory handicaps or speech defects.

Materials

The original set of test questions consisted of 25 items. The questions were designed to emphasize cognitive processes rather than academic skills or achievement. The items logically fell into three broad categories:

Group I questions that elicited imaginative and free association responses for which there could be no one correct answer. Group II questions required a problem-solving response to a situation but again there was no one correct answer. Group III questions required problem solving and there was only one correct answer. In these items, the correct response was contained in or could be inferred from the question.

Each question was reproduced on an individual 5" x 8: card for use in administration of the test. (See Appendix A for a list of

questions used.)

Procedure

In administering the test, precautions were taken to avoid influencing to any great degree the types of responses given. The test was administered orally, thus avoiding the effects of gross reading disabilities among the retarded population and/or the nonretarded population which could interfere with written performance. Each child was tested individually. A time limit of 15 seconds per response was set, and the testers were instructed to read each question only once unless asked to repeat it. The individual note cards were shuffled after each administration to prevent the possibility of tester's preference of test items having any influence upon responses. The children tested were informed beforehand that this was not a regular classroom test with right and wrong answers but that the interest was in how they answered the questions asked of them.

Results

The results were summarized into the frequency and percentage of occurrence of each response to each question (See Appendix A).

There was a variable number of different responses to each question, ranging from an item (No. 12) which drew only one response from the nonretarded group to two items (Nos. 2 and 15) which generated 25 different responses each. The range of different responses for the EMR group ranged from 4 (Nos. 13 and 17) to 33 (No. 5).

In 16 out of 24[1] questions, the most frequent response given by both groups of children was identical. Most of the questions in which each group gave different modal responses were Group I questions, questions

[1]Question 25 was eliminated, since it was an ambiguous item.

which elicited imaginative and free association responses, and question 15, an item which both groups had difficulty answering correctly (27% of nonretarded and 1.5% of EMR children responded correctly). It was the only item in the test that required both perceptual discrimination and deductive reasoning.

The different number of responses to each question appears to be related to both the type of question and the level of difficulty. When the items were classified by type of question, the range of differential responding was as follows: Group I questions (imaginative, free association) generated the greatest number of different responses, ranging from 17 to 25 in the nonretarded group and 19 to 33 in the EMR population; Group II questions (problem solving with no one correct solution required) generated an intermediate number of responses which ranged from 8 to 15 for the nonretarded group and 10 to 28 for the retarded population; Group III items (problem solving with only one correct answer) generated the lowest number of different responses to the questions. The range for the normal group was 1 to 7 different responses; for the EMR group the range was 4 to 12. This description of range excepts question number 15 which proved extremely difficult and generated many different responses: 25 in the nonretarded group and 28 in the EMR group.

PHASE II--ANTICIPATION STUDY

The purpose of the second phase of the study was to explore the accuracy of prediction among college student groups at various levels of preparation (i.e., undergraduate and graduate, education majors and nonmajors, beginning and advanced special education majors). Specifically,

the differential abilities to predict the most common responses given by EMR and nonretarded children to the set of questions described in Phase I was studied in relationship to specific subject variables.

Method

Subjects

A total of 77 males and 213 females from Indiana University participated in the study. These subjects were recruited from courses in undergraduate special education (N=83), undergraduate psychology (N=52), undergraduate educational psychology (N=59), and graduate special education (N=96). Table 1 contains frequency distributions describing the subjects in terms of age, academic major, credit hours in special education, and experience with EMR children.

The interrelationships among several of the subject variables were explored through correlation techniques and a contingency table. The correlation matrix is presented in Table 2. Inspection of this matrix reveals that none of the correlations are of practical significance.

A contingency table tabulating major by experience with EMR children is displayed in Table 3. Special education majors accounted for 65% of the subjects with extensive experience, 50% with moderate, 52% with little, and only 22% with no experience. In spite of this, 48% of the special education majors had had no experience with EMR children. In this sample, experience with EMR children and a declared major in special education are positively related.

Materials

A questionnaire was developed consisting of the 24 items that were used to gather children's responses in Phase I. From the available pool

Table 1

Frequency Distributions of Subject Variables

Variable	N
Age	
18-19	43
20-21	165
22-23	37
24+	38
No data	7
Total	290
Major	
Special Education	88
Elementary Education	51
Psychology	56
Secondary Education	18
Other	67
No data	10
Total	290
Hours in Special Education	
0	135
1-3	66
4-6	29
7-9	16
10-12	12
12+	15
No data	17
Total	290
Experience with EMR Children	
None	204
Little	43
Moderate	26
Extensive	17
Total	290

Table 2

Correlation of Dependent and Subject Variables

	Sex	Age	Hours in sp. ed.	Experience with EMR	Congruency score	No. correct nonretarded	No. correct EMR
Sex (1=male, 2=female)	1.00 +(290)	- .019 (290)	.037 (290)	.246 (290)	.148 (290)	.004 (290)	.156 (290)
Age		1.00 (290)	- .027 (290)	.034 (290)	.114 (290)	- .015 (290)	.131 (290)
Hours in special education			1.00 (290)	.210 (290)	.197 (290)	.033 (290)	.175 (290)
Experience with EMR children (none, little moderate, extensive)				1.00 (290)	.214 (290)	.059 (290)	.230 (290)
Congruency Score					1.00 (290)	.164 (290)	.915*** (290)
No. correct, nonretarded						1.00 (290)	.113 (290)
No. correct, EMR							1.00 (290)

+Note--Indicates number of subjects used in determining the correlation.

*** $p < .001$

Table 3

Contingency Table[1] of Major by Experience with EMR Children

Major	No Experience	Little Experience	Moderate Experience	Extensive Experience	Row Total
Special Education Major	42 48% 22%	22 25% 52%	13 15% 50%	11 12% 65%	88 31%
Elementary Education Major	38 74% 20%	7 14% 17%	3 6% 12%	3 6% 18%	51 18%
Psychology Major	48 86% 25%	4 7% 10%	4 7% 15%	0	56 20%
Secondary Education Major	17 94% 9%	1 6% 2%	0	0	18 6%
Other Major	50 75% 26%	8 12% 19%	6 9% 23%	3 4% 18%	67 24%
Column Total	195 70%	42 15%	26 9%	17 6%	N=280

[1]Each entry consists of the frequency, the row percentage, and the column percent.

of children's responses, 10 were selected for each question. The five most frequently given responses by both nonretarded and EMR samples were included. In some instances, this selection process did not result in a total of ten responses, since both samples sometimes gave the same responses to a question. In those cases, responses with lower frequencies were included.

The 24 questions, each with 10 corresponding answers, were duplicated and assembled into a booklet. Instructions for the subjects were printed on a cover page. Subjects were directed to read each question and set of answers and to indicate which answer was most commonly given by each subgroup of children, EMR and nonretarded. A brief description of the children in each group, as well as the mode of collection of the normative data, was furnished to the college students. (See Appendix B for a copy of the questionnaire and instructions.)

Procedure

The questionnaire was presented during a regular class session. Testing took place during the last two weeks of classes of the spring semester, 1971.

Demographic information was collected from the subjects on the following variables: sex, age, academic major, hours in special education courses, and experience with retarded children.

Dependent Measures

Two dependent measures were devised: (a) number of correct anticipations on EMR and nonretarded samples separately and (b) congruency score. The number of questions correctly anticipated based on the highest-percentage response to the question by each sample of children was cal-

culated with a possible score of 24 for each subject on each sample. For some questions there were two or more responses with identical percentages. In these instances, if any of those responses was selected by the subject, the response was scored as a correct anticipation.

There were 16 questions where the largest percentage of the EMR and nonretarded children responded identically to the question asked. Each subject's congruency score was the number of questions from those 16 in which he ascribed the same correct response to both groups of children.

Results

Six subject variables were chosen for analysis: sex, academic major, age, hours in special education courses, experience with EMR children, and the course in which the subject was enrolled while engaging in the study.

Correlations were computed between the subjects' dependent measures (see Table 1, page 9). Since the correlation between the congruency score and the number correct for EMR children was highly significant (r = +.915, df = 289, p < .001), only the analyses based on the latter dependent variable are presented. The correlation between the number correct for EMRs and that for nonretardates was not significant (r = .11, df = 289).

Each of the six subject variables was analyzed separately in a two-way fixed analysis of variance with repeated measures over the effect of children (EMR and nonretarded).[2]

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[1]Regression analysis is a better type of analysis to use with this design, but two of the subject variables, age and hours in special education courses, were not linearly related to the dependent variables. Hence, regression could not be used.

On the number-correct measure, the range of correctly anticipated responses for the EMR population for the total subject pool was 0-15 with a mean of 5.5 correct. For the normal population the range was 5-18 with a mean of 13.2.

Factor analyses were performed on the subjects' responses to the questionnaire.

Sex

The main effect of sex was significant ($F = 4.59$, $df = 1,288$, $p < .05$), with females having higher scores than males. The children sample effect was highly significant ($F = 1,297$, $df = 1,288$, $p < .001$) with scores on nonretarded children higher than those on EMR children.[3] The two-way interaction of sex and children sample was also significant ($F = 5.33$, $df = 1,288$, $p < .05$). The Scheffé method for post-hoc comparisons revealed that when anticipating the responses of retarded children, females scored significantly better than did males ($p < .01$); females and males did not differ significantly in anticipating nonretarded responses. Figure 1 presents this interaction, and Tables 4 and 5 present a summary of the analysis.

Age

Subjects were divided into the following age groups: 18-19, 20-21, 22-23, and 24+.

The main effect of age was significant ($F = 3.40$, $df = 3,279$, $p < .05$). Post-hoc analyses using the Scheffé method indicated that the 24+ group scored significantly better than the 22-23 group ($p < .05$). See Tables 6 and 7 for these results.

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[3] The main effect of the children sample remained approximately constant from analysis to analysis. Since the effect was always significant, it is reported for the first analysis only. Two-ways ANOVAs were used on the remaining analyses to examine interaction effects.

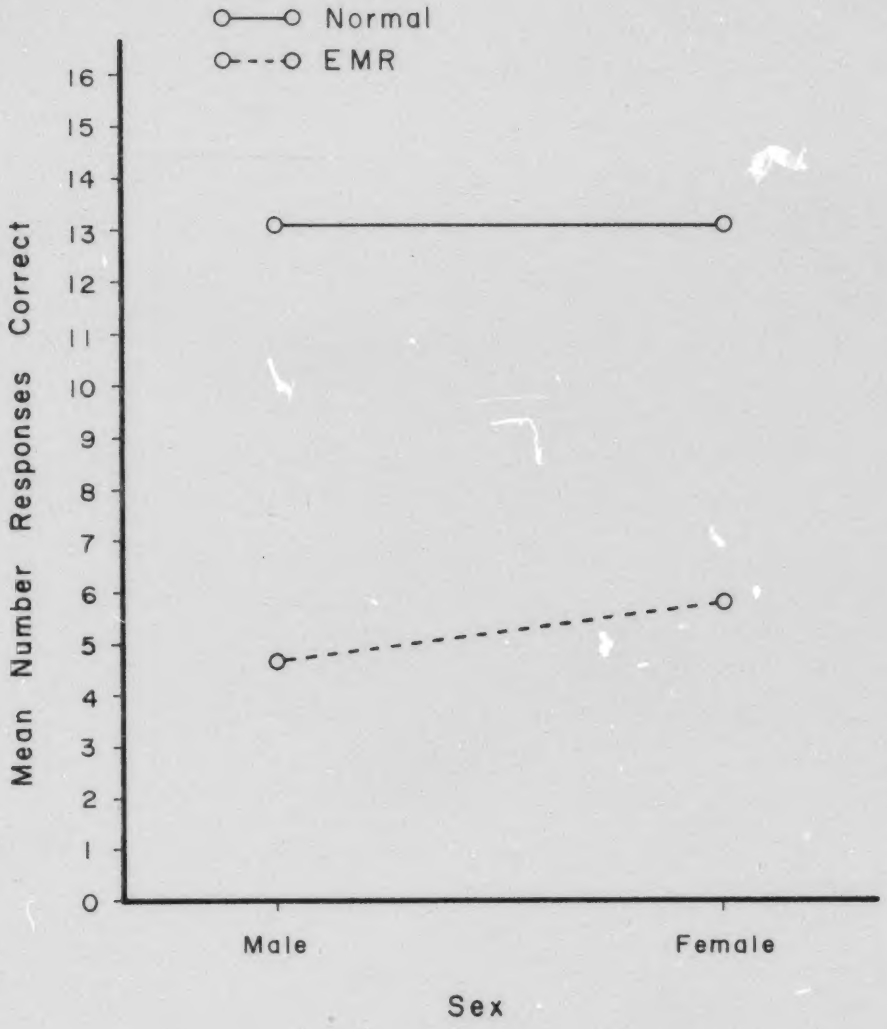

Figure 1. Mean number of responses correct on EMR and non-retarded children for male and female subjects.

Table 4

Analysis of Variance on

Number Correct for Sex

Source	df	MS	F
Between			
Sex (S)	1	37.73	
Error	288	8.21	4.59*
Within			
Children Sample (CS)	1	8620.17	1296.80***
S x CS	1	35.43	5.33*
Error	288	6.65	

*$p < .05$

***$p < .001$

Table 5

Means and Standard Deviations of Number Correct for Sex

Sex	Children: EMR	Children: Nonretarded	Children: Total
Male			
Mean	4.62	13.16	8.89
S.D.	3.34	2.31	2.87
Female			
Mean	5.71	13.17	9.46
S.D.	3.14	2.10	2.67
Total			
Mean	5.46	13.17	9.32
S.D.	3.23	2.15	2.74

Table 6

Summary of Analysis of Variance on

the Number Correct for Age

Source	df	MS	F
Between			
Age (A)	3	27.529	3.40*
Error	279	8.090	
Within			
Children Sample (CS)	1	8504.657	1286.67***
A x CS	3	13.401	2.03
Error	279	6.610	

*$p < .05$

***$p < .001$

Table 7

Means and Standard Deviations of Number Correct for Age

Age	Children: EMR	Children: Nonretarded	Children: Total
18 & 19			
Mean	5.21	13.54	9.37
S.D.	3.01	2.13	2.61
20 & 21			
Mean	5.41	13.32	9.37
S.D.	3.25	2.01	2.70
22 & 23			
Mean	4.60	12.30	8.45
S.D.	2.65	2.32	2.49
24+			
Mean	6.66	13.13	9.89
S.D.	3.54	2.46	3.05
Total			
Mean	5.44	13.19	9.32
S.D.	3.22	2.15	2.74

The interaction effect was not significant, although more of the variation between the groups was in the responses to the EMR, not the nonretarded children.

Academic Major

The subjects were divided into five categories according to their reported major: special education, elementary education, psychology, secondary education, and other. This main effect was significant (F = 6.48, df = 4,275, $p < .001$). Scheffé post-hoc analyses indicated that special education majors anticipated responses significantly more accurately than did psychology and other majors ($p < .01$). See Tables 8 and 9 for these results. Again the interaction effect was not significant, although more of the variation between groups was found for the responses to the EMR, rather than the nonretarded children.

Semester Hours in Special Education

Subjects were divided into the following groups: 0, 1-3, 4-6, 7-9, 10-12, and 13+ hours. The hours main effect was significant (F = 4.12, df = 5,266, $p < .01$). Scheffé post-hoc analyses showed no significant differences, but as Table 11 indicates, the 13+ group had the highest mean score while the 7-9 and 0 groups had the lowest scores.[4] The interaction effect was also significant (F = 2.54, df = 5,266, $p < .05$). Scheffé post-hoc tests indicated that there were no differences among any groups in correctly anticipating the responses of retarded or nonretarded children. However, there was more relative variation between

[4]The Scheffé method of post-hoc analysis is conservative; hence, this result is reasonable.

Table 8

Summary of Analysis of Variance on

Number Correct for Major

Source	df	MS	F
Between	279	8.25	
Major (M)	4	49.54	6.48***
Error	275	7.65	
Within	280	35.94	
Children Sample (CS)	1	8216.12	1236.04***
M x CS	4	5.10	.77
Error	275	6.65	

***$p < .001$

Table 9

Means and Standard Deviations of Number Correct for Academic Major

Major	Children: EMR	Children: Nonretarded	Children: Total
Special Education			
Mean	6.53	13.72	10.13
S.D.	3.35	2.04	2.77
Elementary Education			
Mean	5.61	13.12	9.36
S.D.	3.37	1.99	2.77
Psychology			
Mean	4.70	12.59	8.64
S.D.	2.91	2.37	2.65
Secondary Education			
Mean	5.28	13.22	9.25
S.D.	2.78	1.40	2.20
Other			
Mean	4.76	12.90	8.83
S.D.	2.91	2.24	2.60
Total			
Mean	5.49	13.15	9.32
S.D.	3.21	2.14	2.73

the groups in anticipating EMR children's responses; again, the 13+ group had the highest scores and the 7-9 and 0 groups the lowest. Tables 10 and 11 and Figure 2 present these results.

Experience with EMR Children

Subjects were divided into four groups: no experience, a little experience, moderate experience, and extensive experience. This main effect was significant ($F = 4.60$, $df = 3,286$, $p < .01$). Scheffé post-hoc analyses indicated that those subjects with extensive experience anticipated children's responses better than those with no ($p < .01$) or little ($p < .05$) experience; also, those with moderate experience anticipated better than those with none ($p < .05$). The interaction effect also was significant ($F = 3.34$, $df = 3,286$, $p < .05$). Scheffé post-hoc analyses indicated that subjects with extensive experience anticipated EMR responses better than those with none ($p < .05$); there were no differences among the groups in anticipation of nonretarded. Tables 12 and 13 and Figure 3 present these results.

Current Course Enrollment

Subjects were split into four groups: undergraduate special education, undergraduate educational psychology, undergraduate psychology, and graduate special education. The main effect of course was significant ($F = 2.80$, $df = 3,286$, $p < .05$). The Scheffé method of post-hoc analysis indicated no significant differences, although subjects in special education graduate and undergraduate courses had the highest anticipation scores. The interaction effect also was significant ($F = 3.31$, $df = 3,286$, $p < .05$).

Table 10

Summary of Analysis of Variance on the

Number Correct for Semester Hours in Special Education

Source	df	MS	F
Between	271	7.82	
Hours (H)	5	30.46	4.12*
Error	266	7.40	
Within	272	37.04	
Children Sample (CS)	1	8300.78	1303.58***
H x CS	5	16.18	2.54*
Error	266	6.37	

*$p < .05$
**$p < .01$
***$p < .001$

Table 11

Means and Standard Deviations of Number Correct

For Semester Hours In Special Education

Hours	Children: EMR	Children: Nonretarded	Children: Total
None			
Mean	4.60	13.00	8.80
S.D.	2.99	2.23	2.64
1-3			
Mean	5.92	13.17	9.55
S.D.	3.12	2.06	2.64
4-6			
Mean	6.31	13.76	10.03
S.D.	3.41	2.20	2.87
7-9			
Mean	4.63	13.25	8.94
S.D.	2.94	2.27	2.63
10-12			
Mean	6.92	12.58	9.75
S.D.	3.06	2.43	2.76
13+			
Mean	7.47	13.80	10.46
S.D.	1.51	1.52	1.52
Total			
Mean	5.36	13.16	9.26
S.D.	3.12	2.17	2.69

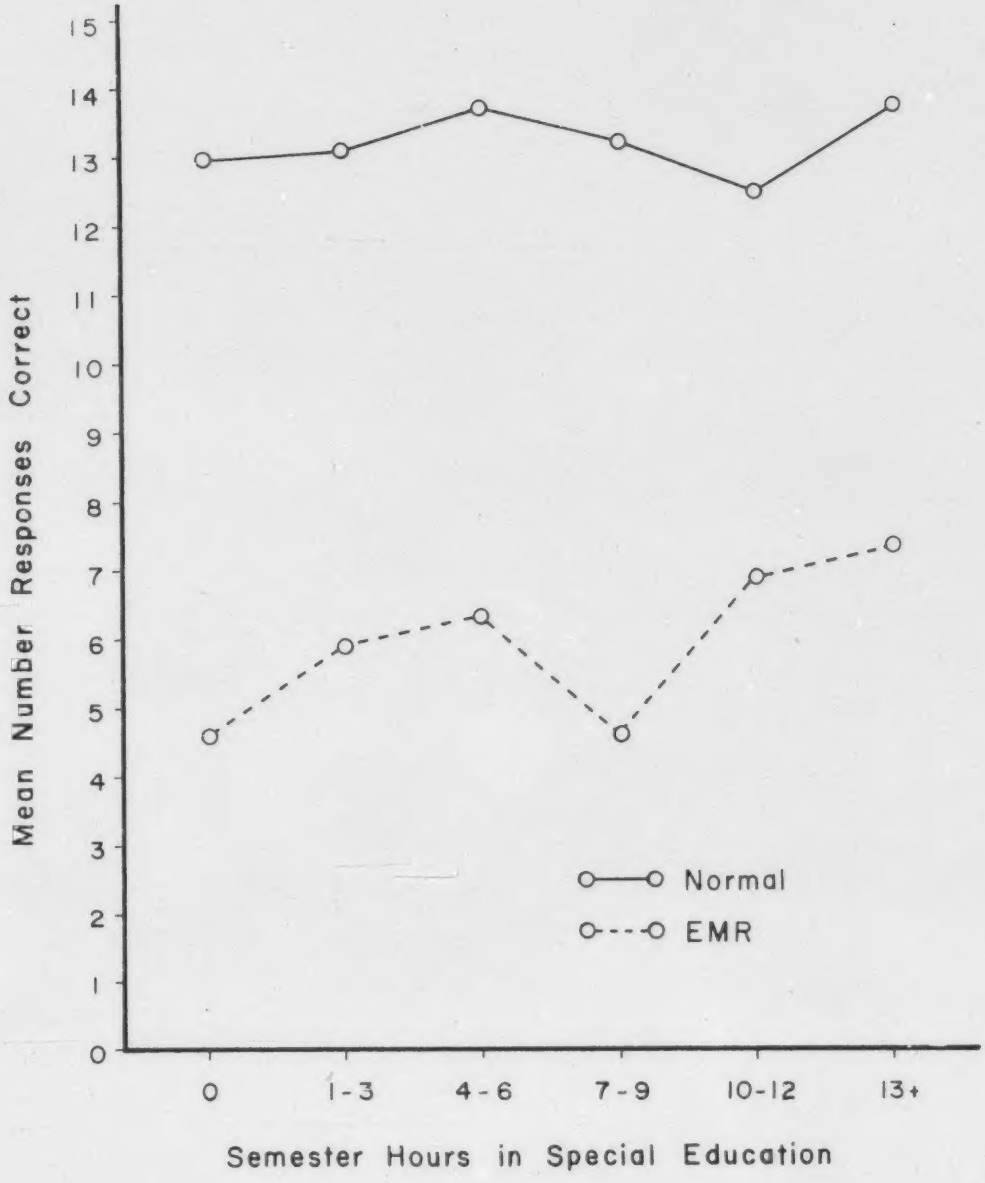

Figure 2. Mean number of responses correct on EMR and nonretarded children for number of semester hours in special education courses.

Table 12

Summary of Analysis of Variance on

Number Correct for Experience with EMR Children

Source	df	MS	F
Between	289	8.32	
Experience (E)	3	36.90	4.60**
Error	286	8.02	
Within	290	36.45	
Children Sample (CS)	1	8620.17	1308.70***
E x CS	3	22.00	3.34*
Error	286	6.59	

*$p < .05$
**$p < .01$
***$p < .001$

Table 13

Means and Standard Deviations of Number Correct For Past Experience with EMR Children

Experience	Children: EMR	Children: Nonretarded	Children: Total
None			
Mean	5.02	13.15	9.08
S.D.	3.12	2.13	2.67
Little			
Mean	5.98	13.07	9.52
S.D.	2.78	2.04	2.44
Moderate			
Mean	6.69	12.96	9.83
S.D.	3.12	2.57	2.86
Extensive			
Mean	7.53	14.00	10.76
S.D.	4.38	2.03	3.41
Total			
Mean	5.46	13.17	9.32
S.D.	3.23	2.15	2.74

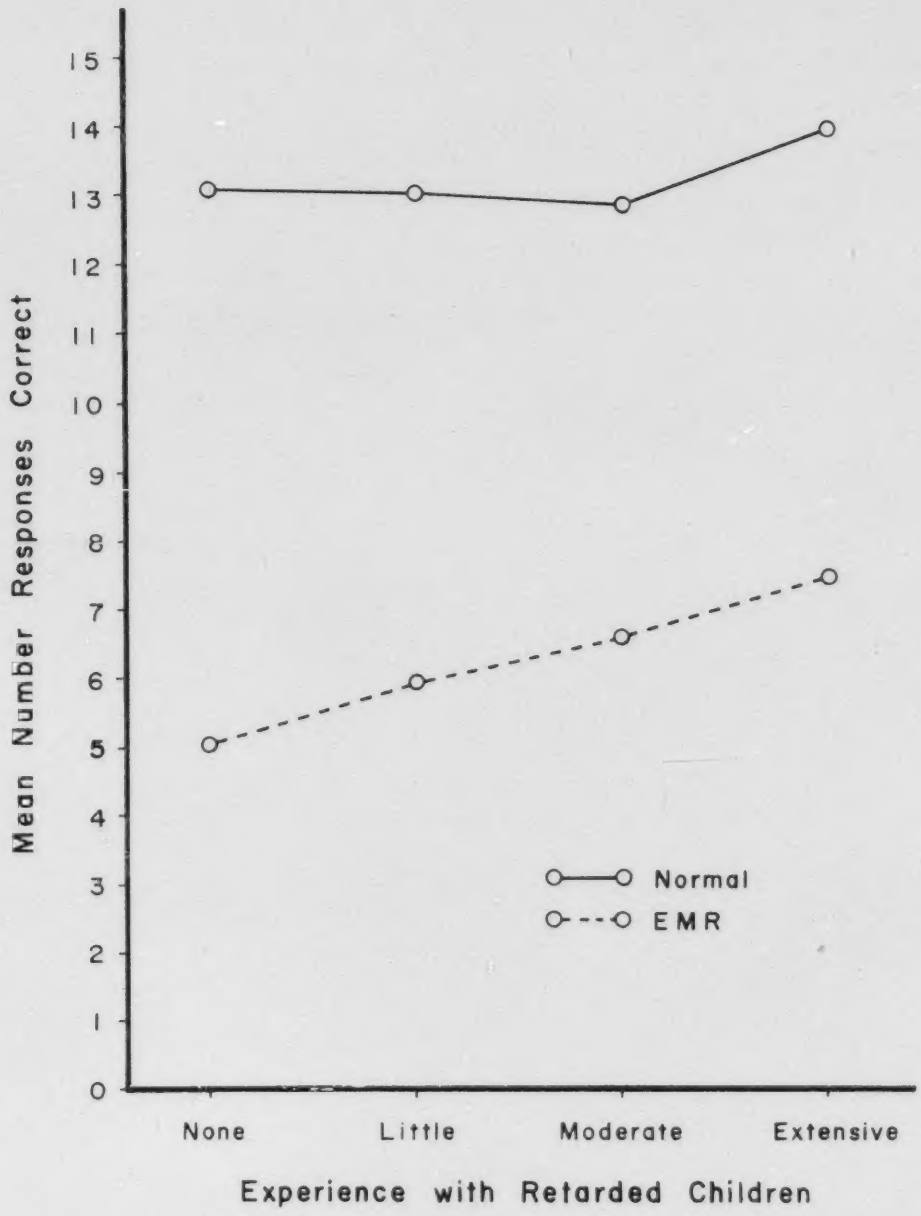

Figure 3. Mean number of responses correct on EMR and nonretarded children for amount of experience with EMR children.

Scheffé tests indicated no differences among groups in anticipating retarded or nonretarded children's responses, although students in undergraduate and graduate special education courses had approximately equal mean scores on EMR responses, and these scores were higher than those of the students in undergraduate psychology and undergraduate psychology; there were no differences for nonretarded children's responses. Tables 14 and 15 and Figure 4 present these results.

Factor Analyses

Factor analyses were performed on the college students' responses to the 24 questions. Their responses were scored and tabulated as correct or incorrect. Analyses were performed separately for responses to the EMR population and the nonretarded population.

The principal components solution with varimax (orthogonal) rotation was used with squared multiple correlations in the diagonal of the correlation matrices. The matrices used in the analyses can be found in Appendix C. The factors that were rotated had eigenvalues greater than or equal to one.

The items in the questionnaire had previously been classified into three types of question groups: problem solving for which there was one correct answer; problem solving with no one correct solution required; and imaginative, free association questions. The major purpose of the factor analysis was to determine the factor validity of the a priori classifications.

Table 14

Summary of Analysis of Variance on

Number Correct for Current Course Enrollment

Source	df	MS	F
Between	289	19.24	
Course (C)	3	52.86	2.80*
Error	286	18.89	
Within	290	44.54	
Children Sample (CS)	1	7962.42	475.52***
C x CS	3	55.36	3.31*
Error	286	16.74	

*$p < .05$
***$p < .001$

Table 15

Means and Standard Deviations

Of Number Correct for Current Course Enrollment

Course	Children: EMR	Children: Nonretarded	Children: Total
Educational Psychology (Undergraduate)			
Mean	4.76	13.25	9.01
S.D.	3.21	1.87	2.63
Psychology (Undergraduate)			
Mean	4.31	12.64	8.47
S.D.	2.72	2.47	2.60
Special Education (Undergraduate)			
Mean	6.15	13.53	9.84
S.D.	3.43	1.63	2.68
Special Education (Graduate)			
Mean	6.26	13.17	9.75
S.D.	3.09	2.44	2.78
Total			
Mean	5.46	13.17	9.32
S.D.	3.23	2.15	2.74

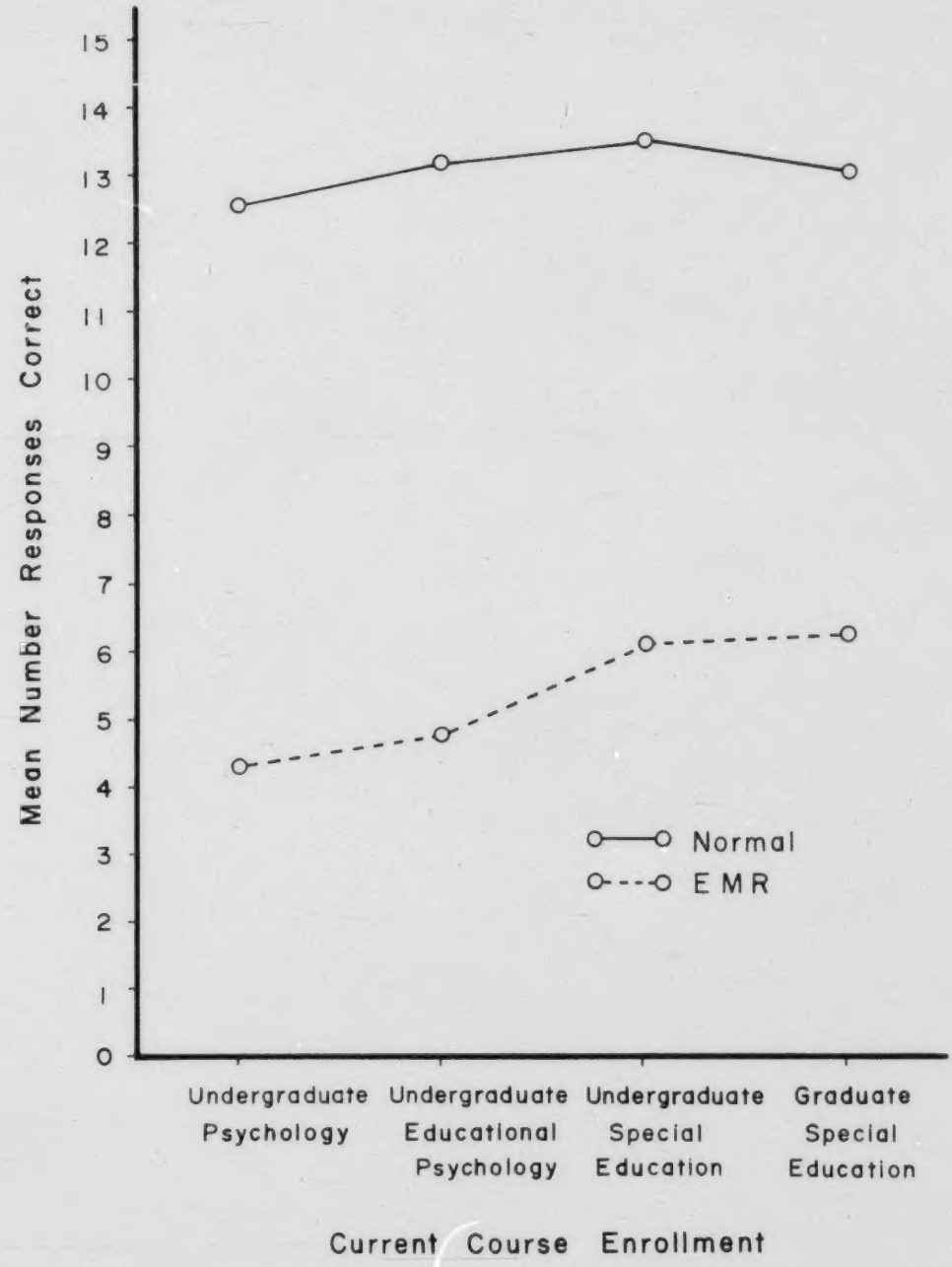

Figure 4. Mean number of responses correct on EMR and nonretarded children for current course enrollment of subjects.

For the anticipation of EMR responses, the analysis resulted in only one factor. The questions that loaded highest on this factor were problem-solving questions for which there was only one correct answer. This factor accounted for 71.7% of the variance for the retarded population. For the nonretarded responses, the analysis also resulted in one factor accounting for 43.4% of the variance. This factor was similar to the one found for EMRs but was not nearly as strong. The items that loaded heavily on this factor were also problem-solving questions for which only one answer was correct. The other two types of question groups did not load heavily. Hence, the factor analyses did not support the a priori classifications. The loadings for the one factor for both EMR and nonretarded children's responses can be found in Tables 16 and 17, respectively.

Discussion

The results of the factor analyses, done on the subjects' responses for both EMR and nonretarded children, indicate that the questionnaire basically is homogeneous. Although there logically are three types of items involved in the questionnaire, this did not result in three separate factors characterized by high item loadings from the respective item types. Instead, only one factor resulted. In both cases, it is characterized by high loadings from the problem-solving, "one correct answer" type of item. This indicates that a "purer" factor structure, as well as a more reliable measure, would occur if the other types of items were eliminated from the questionnaire.

Table 16

Rotated Loadings on Factor I for the Responses to the EMR Children

Question No.	Loading on Factor I
1	-.054
2	.008
3	-.211
4	.023
5	.179
6	-.159
7	-.260
8	.006
9	.097
10	-.453
11	-.488
12	-.441
13	-.528
14	-.587
15	-.185
16	-.414
17	-.372
18	-.029
19	-.220
20	-.186
21	.075
22	-.518
23	-.681
24	-.556

Table 17

Rotated Loadings on Factor I for the Responses to the Nonretarded Children

Question No.	Loading on Factor I
1	.039
2	.080
3	.141
4	-.051
5	-.055
6	.063
7	-.129
8	.018
9	.021
10	-.025
11	-.295
12	-.400
13	-.461
14	-.544
15	-.265
16	-.049
17	-.093
18	-.118
19	-.054
20	.003
21	-.096
22	-.079
23	-.334
24	-.516

In general, the results from the study indicate that all groups of college students can anticipate nonretarded children's responses at a reasonable level of accuracy (mean of 13.2 correct out of a possible 24). However, none of the groups correctly anticipated EMRs' responses at any level of proficiency (mean of 5.5 correct out of 24). Given that no group does very well at that task, the following groups of students were better at anticipation of EMR responses than were their counterparts: special education majors, students in special education courses, students who have had experience with EMR children, oldest students, and females.

Although special education majors are better at anticipating EMR responses than other groups, their accuracy does not improve as they progress through the program: graduate special education majors do not anticipate more accurately than undergraduate majors. However, undergraduates generally become better anticipators as they progress through the undergraduate portion of the program.

The analysis of the questionnaire revealed that on 16 of the 24 questions the most frequent response given by EMR and nonretarded children was the same. From the results of the second phase of the study, it is clear that college students, even special education majors, do not give the EMR children credit for responding as nonretarded children would. One explanation of this may concern the content of special education courses and courses on the exceptional child. Most of the courses emphasize the differences between mentally retarded and nonretarded children. Also, the label "mentally retarded" undoubtedly contributes to the idea that EMR children are cognitively different.

Another interesting and unexpected finding is that students who have had between seven and nine semester hours of special education courses (i.e., two or three courses) do as poorly in anticipating EMR responses as those with no hours in the field. Perhaps at this point in coursework, students are oversensitized to the differences between EMR and nonretarded children to such an extent that their anticipation of EMR responses are as poor as those students who have never had any courses in the field. If this result is general and can be replicated at other institutions, it has some important implications for special education training programs. Either the courses should be modified to de-emphasize differences or present the differences in some other manner, or prospective teachers who will be working with EMR children should take more than nine hours of work in special education.

In essence, it appears that the special education majors who will be teaching mentally retarded children are not highly accurate in anticipating the children's cognitive responses. They appear to expect EMR children to perform at a lower cognitive level than nonretarded children of comparable age. Because of this belief, they may teach at a lower level than necessary and/or communicate their low expectations to their students. This may result in the children actually performing to meet the teachers' low expectations and hence setting up a vicious self-fulfilling prophecy. Obviously, this is conjecture for further investigation. However, the work reported by Beez (1970) tends to support this view.

Groups who are most familiar with EMR children (majors, those who have had experience with EMR children, and those enrolled in special

education courses) tend to recognize the similarities between EMR and nonretarded children and thus anticipate their responses better than other college groups. However, they still only anticipate EMR children's responses at about half their accuracy level in anticipating the responses of nonretarded children.

This study gives an indication that there are points of common ground between normal and EMR children that need to be explored and taught, not only to future special education teachers but also to all future teachers.

This study is a radical departure from the two types discussed in the introduction. It operationally defines anticipation and has subjects predict the results of events that already have occurred. It develops the use of the construct of anticipation in exploring what various groups of college students know about retarded and nonretarded children's cognitive behaviors.

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Appendix A

Questions Used in Preparing Normative Data Base.

Tables indicate both common responses of EMR and nonretarded children and responses unique to each group.

1. Question: What kind of a friend would a rock make?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
No response	5	7.6	No response	3	4.6
A good one	4	6.1	A good one	6	9.2
I don't know	4	6.1	I don't know	5	7.7
good weapon	2	3.0	weapon	1	1.5
dirt	1	1.5	dirty	2	3.1
another rock	1	1.5	another rock	2	3.1
enemy	1	1.5	an enemy	1	1.5
The responses below were given by only one group.					
a hard/tough one	15	22.5	good friend to dirt	2	3.1
a bad one	9	13.6	no friend	21	32.3
he wouldn't make one	8	12.1	a hard head	1	1.5
a quiet one	3	4.5	rocky friend	2	3.1
boring/dull	2	3.0	collection	3	4.6
pebble	1	1.5	not so good	5	7.7
for throwing	1	1.5	hard	1	1.5
turtle	1	1.5	any	1	1.5
souvenir	1	1.5	like winning money	1	1.5
hard to get to know	1	1.5	to sit on	1	1.5
lonely	1	1.5	send	1	1.5
ground would be friend to him	1	1.5	time	1	1.5
hard to get along with	1	1.5	stoned friend	2	3.1
a dead one	1	1.5	sitting there	1	1.5
heavy one	1	1.5	weighty	1	1.5
like a little boy	1	1.5	sling shot	1	1.5

2. Question: How would you feel if you were a leaf on a maple tree?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
lonesome	5	7.6	lonesome	1	1.5
I don't know	5	7.6	don't know	10	15.4
like falling	5	7.6	feel like falling	1	1.5
stupid, funny	5	7.6	feel funny	2	3.1
good	4	6.1	good	3	4.6
no response	3	4.5	no response	2	3.1
like a leaf	3	4.5	just like other leaves	9	13.9
free	3	4.5	free	2	3.1
green	2	3.0	green	1	1.5
sick	2	3.0	sick	2	3.1
cold	1	1.5	cold	2	3.1

The responses below were given by only one group.

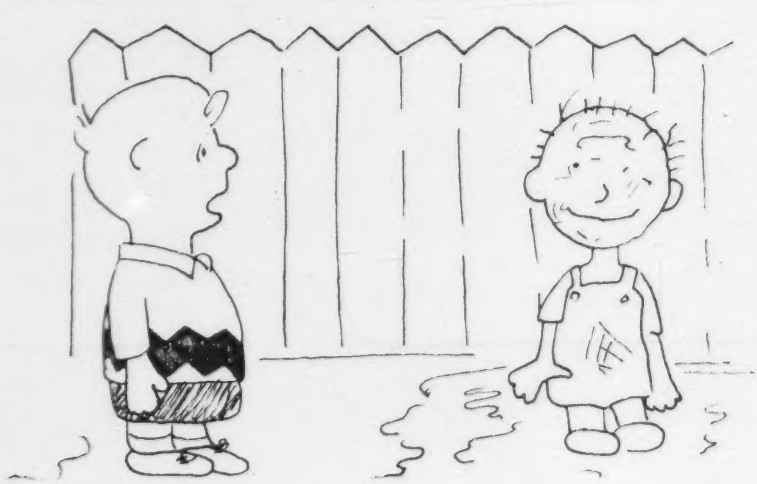
bad	5	7.6	not so good	17	26.2
hangy	5	7.6	fall off	1	1.5
sticky	4	6.1	gooey	1	1.5
light	2	3.0	too wiry	1	1.5
airborne	2	3.0	windy	1	1.5
drowsy	2	3.0	leaves don't have feelings	1	1.5
stuck	1	1.5	swavy	1	1.5
small	1	1.5	nope	1	1.5
mapley	1	1.5	don't know what that is	1	1.5
crowded	1	1.5	high	1	1.5
wouldn't feel any different	1	1.5	not too swift	1	1.5
together	1	1.5	sad	1	1.5
restless	1	1.5	fun	1	1.5
I'd feel like I didn't have much time to live	1	1.5	wouldn't like	1	1.5

3. Question: How would you stop from melting if you were an ice cube?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
put self in freezer/ refrigerator/ icebox	39	58.6	get in freezer	25	38.4
go someplace where it's cold	11	16.5	go where it's cold	8	12.3
cool it	1	1.5	cool it	3	4.6
The responses below were given only by one group.					
go in the snow	1	1.5	stay cold	9	13.9
get out of the sun	6	9.1	jump in some water	1	1.5
go in the shade	3	4.5	no response	2	3.1
I couldn't stop it	2	3.0	cool off	1	1.5
eat myself	1	1.5	melt	6	9.2
get in a glass of water	1	1.5	stove	1	1.5
go to Alaska	1	1.5	don't know	1	1.5
			light a fire	1	1.5
			not get by hot places	1	1.5
			stay out of hot places	6	9.2

4. Question: What do you think Charlie Brown is saying to Pigpen?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
you're dirty	14	21.0	you're dirty	18	27.7
you're a mess	5	7.6	you're a mess	7	10.8
what's happening?	3	4.5	what happened	2	3.1
you're all wet	2	3.0	you're all wet	3	4.6
The responses below were given by only one group.					
go take a bath	21	31.5	get out of the mud	1	1.5
what's he doing in the mud puddle	6	9.1	get cleaned up	7	10.8
good grief	3	4.5	you're muddy	1	1.5
no response	2	3.0	don't know	7	10.8
you stink	2	3.0	you blockhead	1	1.5
you're the only person I know that could raise a cloud of dust in a snowstorm/sidewalk	2	3.0	dirty names	1	1.5
get off the sidewalk	1	1.5	get lost	1	1.5
you're the only person I know who carries his dirt with him	1	1.5	be careful	3	4.6
don't play with me no more	1	1.5	hi	1	1.5
move out of my way	1	1.5	splash in the water	1	1.5
go home	1	1.5	what are you doing in there	1	1.5
			pig	4	6.2
			stupid	1	1.5
			you're nasty	4	6.2
			pigpen	1	1.5



5. Question: Charlie Brown is making a wish. What do you think he is wishing for?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
friends	9	13.6	a friend	6	9.2
sunshine/good weather	6	9.1	sunshine	2	3.1
no response	4	6.1	no response	1	1.5
I don't know	3	4.5	don't know	11	16.9
a dog	3	4.5	a dog	4	6.2
the Great Pumpkin	3	4.5	Great Pumpkin	1	1.5
money	2	3.0	money	5	7.7
a bike	1	1.5	a new bike	1	1.5
rain	1	1.5	rain	2	3.1
peace	1	1.5	peace	3	4.6
The responses below were given by only one group.					
about baseball	17	25.8	play baseball	3	4.6
a girl	4	6.1	a girlfriend	2	3.1
someone would come out & play w/him	2	3.0	a good summer	1	1.5
everyone would stop picking on him	1	1.5	wishing he were home	1	1.5
everything will go right	1	1.5	another sister	1	1.5
everyone wouldn't call him blockhead	1	1.5	love	1	1.5
he would be a great man	1	1.5	another C.B.	1	1.5
he can go swimming	1	1.5	no snow	1	1.5
he'll do good things in school	1	1.5	a rug	1	1.5
wishing he will have something	1	1.5	ball	1	1.5
happiness	1	1.5	flowers	4	6.2
			he could fly	1	1.5
			to be a better baseball player	1	1.5
			better ball team	1	1.5
			Snoopy	1	1.5
			luck	1	1.5
			get better clothes	1	1.5

Question 5 cont.

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
			Santa Claus to bring him toys	1	1.5
			ice cream cone	1	1.5
			good birthday	1	1.5
			manhood	1	1.5
			anything	1	1.5
			garden grows	1	1.5

6. Question: If you were locked in a bathroom without a key, how would you get out?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
scream	2	3.0	scream	1	1.5
no response	1	1.5	no response	1	1.5
The responses below were given by only one group.					
through a window	51	77.3	go out the window	28	38.5
bang the door down	6	9.1	get the key out of the door	1	1.5
take the hinges off	2	3.0	call for help	1	1.5
I wouldn't	1	1.5	call the police	1	1.5
call my family	1	1.5	holler	1	1.5
crawl under the door	1	1.5	kick the door down	8	12.3
unlock the door	1	1.5	bust a hole in the window	13	20.0
			knock (pound) on the door	10	15.4

7. Question: What would you do if you were in school and you were the first to find out that the school was on fire?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
pull the fire alarm	25	37.9	pull the fire alarm	22	33.9
call fire/police department	3	4.5	call fire dept.	5	7.7
The responses below were given by only one group.					
tell everybody	11	16.7	tell everyone else	8	12.3
try to find the principal/teacher	10	15.2	tell the teacher	8	12.3
run/get out of the building	9	13.6	run out	9	13.9
I'd be happy/cheer	2	3.0	go to office & tell principal	4	6.2
I don't know	1	1.5	fire escape	1	1.5
report it	1	1.5	run for help	1	1.5
get the fire extinguisher	1	1.5	call for help	1	1.5
let it burn	1	1.5	run to nearest fire alarm, ring it & wait until someone gets there	2	3.1
yell fire	1	1.5	call for fire	1	1.5
I would keep cool	1	1.5	call police	1	1.5

8. Question: What would you do if you wanted something which cost more than you had?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
earn the money for it	20	30.3	earn more money	7	10.8
save for it	15	22.7	saves more money	5	7.7
steal it	6	9.1	steal it	2	3.1
wouldn't buy it	5	7.6	don't buy it	2	3.1
The responses below were given by only one group.					
ask a parent	6	9.1	ask your mother	3	4.6
get more money	9	13.6	go home & get more money	27	41.5
buy something cheaper	3	4.5	get something else for less	10	15.4
charge it	2	3.0	borrow some money	2	3.1
			take it or leave it	1	1.5
			spend it	1	1.5
			don't know	2	3.1
			food	1	1.5
			no response	2	3.1

9. Question: What's a whatchamacallit?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
I don't know	22	33.3	don't know	19	29.3
anything	8	12.1	anything	17	26.2
a thing	7	10.6	a thing	3	4.6
a whatchamacallit	6	9.1	a whatchamacallit	1	1.5
horse	1	1.5	a horse	2	3.1
no response	1	1.5	no response	6	9.2
nothing	2	3.0	nothing	3	4.6
a bird	1	1.5	a bird	1	1.5
The responses below were given by only one group.					
something/forget the name of/someone that you don't know the name	10	15.2	a trick	1	1.5
a thingamagig	1	1.5	that's what it is	1	1.5
everything	1	1.5	same	1	1.5
whatever it is	1	1.5	stranger	1	1.5
something weird	1	1.5	knife	1	1.5
a wastebasket	1	1.5	exact definition of whatchamacallit	1	1.5
no one don't know that	1	1.5	a store	1	1.5
a door	1	1.5	a name	2	3.1
			when you can't remember a word	1	1.5
			what grandma uses	1	1.5
			paper	1	1.5
			someone	1	1.5

10. Question: What would you do if you wanted to get across a river and you couldn't swim?

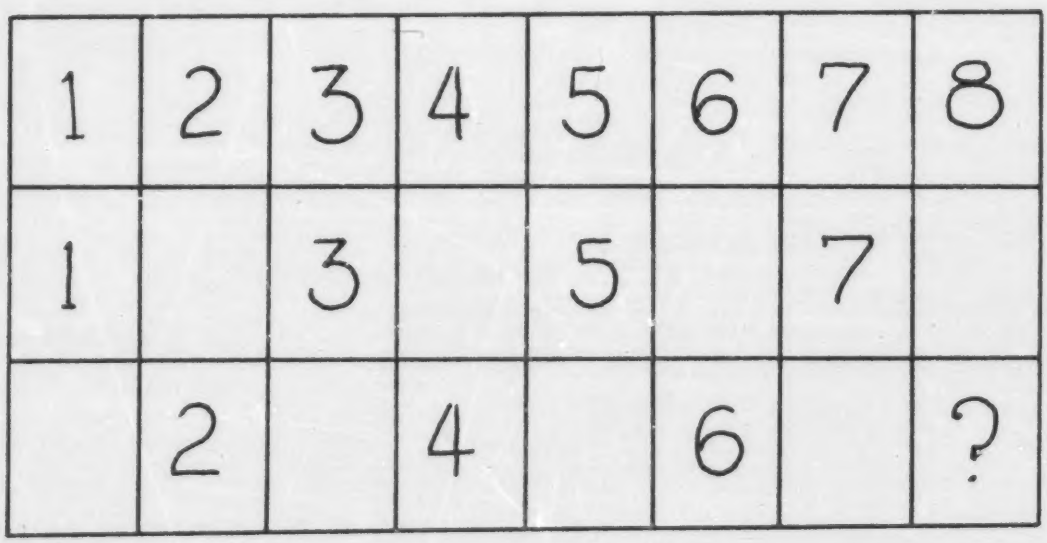
Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
Rent a/find a/ get a/make a boat	45	68.2	take a boat	41	63.1
look for/make a bridge	6	9.1	build a bridge	2	3.1
The responses below were given by only one group.					
wouldn't cross	5	7.6	stay on side	3	4.6
build a raft	3	4.5	raft	3	4.6
climb a tree & jump	3	4.5	drown	1	1.5
walk	1	1.5	get a ride	3	4.6
I'd cry	1	1.5	scream for help	2	3.1
run around it	1	1.5	go around	3	4.6
take an airplane	1	1.5	ford with a stick	1	1.5
			float	1	1.5
			knows how	1	1.5
			board or log & float across	2	3.1
			bridge	2	3.1

11. Question: What number should go in the box where the question mark is?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
8	57	86.4	8	46	70.8
7	2	3.0	7	3	4.6
9	2	3.0	9	7	10.8
10	2	3.0	10	1	1.5

The responses below were given by only one group.

12	1	1.5	24	3	4.6
5	1	1.5	1	2	3.1
no response	1	1.5	2	3	4.6

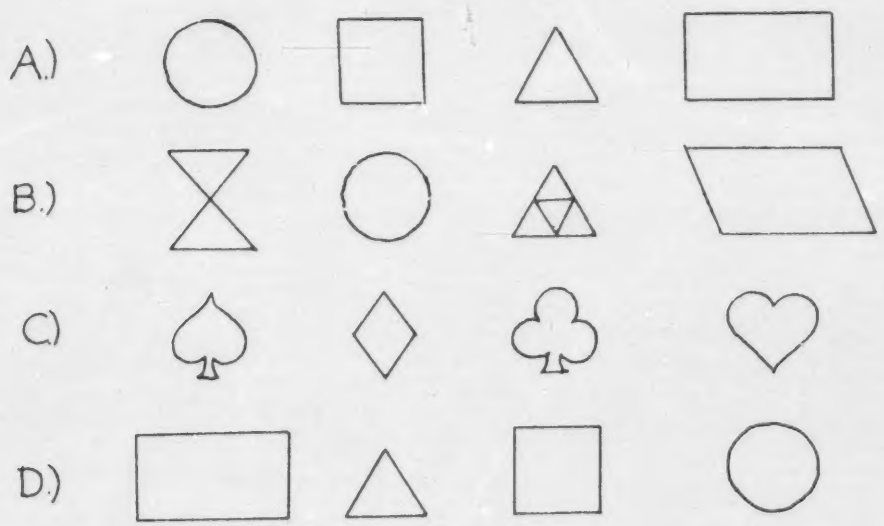


12. Question: Which of the following sets of figures are found on a deck of playing cards?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
C	66	100.0	C	51	76.5

The responses below were given by only one group.

			B	1	1.5
			D	2	3.1
			A	1	1.5
			no response	10	15.4



13. Question: All boys will become men. John is a boy. What will John become?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
a man	65	98.5	a man	62	95.5
The responses below were given by only one group.					
a major	1	1.5	a teenager a truckdriver a lady	1 1 1	1.5 1.5 1.5

14. Question: All dogs bark. Charlie is a dog. What does Charlie do?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
barks	58	87.9	barks	50	75.0
talks	3	4.5	talks	5	7.7
The responses below were given by only one group.					
chews bones	1	1.5	sits on top of his house	1	1.5
runs	1	1.5	runs around	1	1.5
chases cats	1	1.5	plays	1	1.5
howler	1	1.5	walks & talks	1	1.5
bites	1	1.5	plays baseball	1	1.5
			goes answer door	1	1.5
			don't know	1	1.5
			nothing	1	1.5
			smells	1	1.5
			no response	1	1.5

15. Question: What goes in the box?

TOP	POT
TAB	BAT
RAT	TAR
TON	

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
not	18	27.3	not	1	1.5
no response	8	12.1	no response	8	12.3
I don't know	5	7.6	don't know	13	23.1
Tom	5	7.6	tom	1	1.5
top	2	3.0	top	4	6.6
ton	2	3.0	ton	1	1.5
fun	2	3.0	fun	1	1.5
run	1	1.5	run	2	3.5
box	1	1.5	box	1	1.5
bat	1	1.5	bat	1	1.5
ball	1	1.5	ball	1	1.5
The responses below were given by only one group.					
bon	3	4.5	rat	4	6.2
bun	3	4.5	that	1	1.5
tar	2	3.0	tab	3	4.6
cat	2	3.0	oat	1	1.5
tan	1	1.5	hot	2	3.1
won	1	1.5	pot	1	1.5
car	1	1.5	tone	1	1.5
bottom	1	1.5	fox	2	3.0
tip	1	1.5	oar	1	1.5
sun	1	1.5	red	1	1.5
don't understand question	1	1.5	Don	1	1.5
hat	1	1.5	bomb	3	4.6
none	1	1.5	man	1	1.5
street	1	1.5	map	1	1.5
			high	3	4.6
			a letter	2	3.0
			a word	1	1.5

16. Question: What item does not belong in this picture?

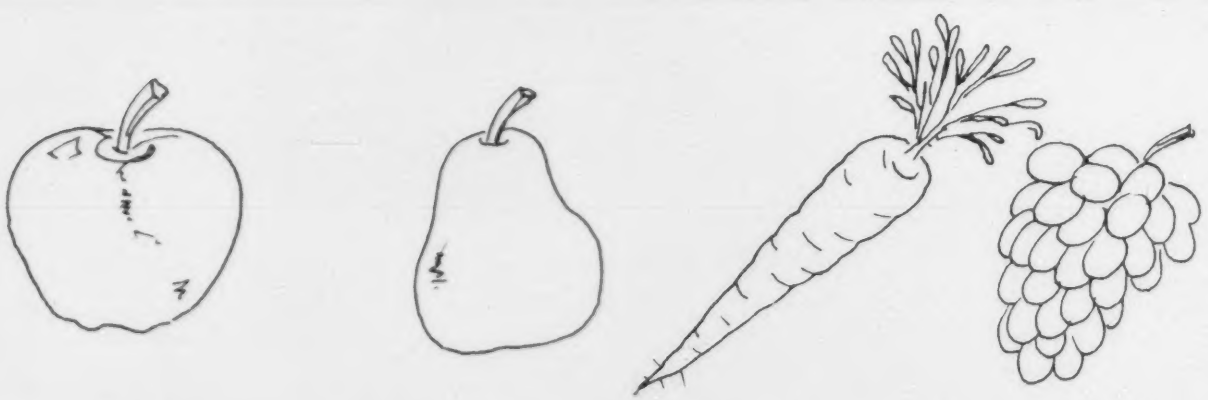
Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
B	47	71.2	B	44	67.8
C	11	16.7	C	9	13.9
A	6	9.1	A	7	10.8
D	1	1.5	D	4	6.2
They all belong	1	1.5	all of it does	2	3.1

17. Question: What item does not belorg in this picture?

Nonretarded			EMR		
Response	Freq-uency	%	Response	Freq-uency	%
C	56	84.8	C	51	76.5
D	9	13.6	D	8	12.3

The responses below were given by only one group.

no response	1	1.5	all of them	3	4.6
			B	3	4.6



18. Question: What is the difference between a cow and a bull?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
cow is female; bull is male	17	25.8	cow is female; bull is male	4	6.2
cow gives milk	6	9.1	cow gives milk	22	33.9
I don't know	2	3.0	don't know	2	3.1
The responses below were given by only one group.					
horns	25	37.9	bull has horns	22	33.9
bull is stronger/ tougher	7	10.6	cows moo	2	3.1
bull is more dangerous	2	3.0	bull will charge	1	1.5
spelled differently	1	1.5	tougher than donkey	1	1.5
doesn't matter	1	1.5	no response	1	1.5
a bull will chase you; a cow just sits there	1	1.5	bull can fight, cows just lay there	1	1.5
cow has horns; bull a ring in nose	1	1.5	color, weight	1	1.5
bull fights in a ring	1	1.5	bull has ring in his nose	1	1.5
they don't look the same	1	1.5	different shape	1	1.5
bull is big & huge; a cow ain't nothing	1	1.5	cow is white,& brown, bull is black	2	3.1
			bull runs	1	1.5
			same	1	1.5
			cow eats grass	1	1.5
			cow-bull	1	1.5

19. Question: How are snow and rain alike?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
temperature	1	1.5	temperature	3	4.6
they ain't alike	1	1.5	aren't alike	2	3.1
The responses below were given by only one group.					
both made of water/ moisture	19	28.8	freezes	3	4.6
fall from the sky/ heaven/clouds	18	27.3	snow falls & melts like water	3	4.6
wet	8	12.1	both wet	5	7.7
when snow melts, it's like water	8	12.1	snow is frost and rain melts	1	1.5
rain's wet; snow's white/icy	2	3.0	snow is white & falls in flakes	1	1.5
both rain; but one freezes	1	1.5	snow is colder	1	1.5
both miserable	1	1.5	color	1	1.5
both precipitation	1	1.5	both water	17	26.2
both kinds of weat weather	1	1.5	evaporates	1	1.5
one's tougher than the other	1	1.5	rain heavy; snow light	1	1.5
one's slushy & the other's watery	1	1.5	weight, color, & temperature	1	1.5
some thing	1	1.5	sky	1	1.5
both make puddles	1	1.5	cold; wet	1	1.5
			cold	1	1.5
			drops; flakes	2	3.1
			both come from sky	3	4.6
			both are cold	2	3.1
			both fall	7	10.8
			shovel snow	1	1.5
			snow is wet; rain is water	1	1.5
			form	1	1.5
			snow is white; rain is gray	1	1.5
			snow is white	1	1.5
			cold wind makes rain turn to ice	1	1.5
			rain comes from snow	1	1.5
			both; snow melts	1	1.5

20. Question: What is the first thing that comes to your mind when I mention the word mother?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
father	18	27.3	father	19	29.3
love	6	9.1	love	7	10.8
takes care of me	4	6.0	takes care of you	3	4.6
family	1	1.5	family	2	3.1
work	1	1.5	work	1	1.5
The responses below were given by only one group.					
my/your mom	9	13.6	Mom/mother	9	13.9
parent	5	7.6	grandmother	1	1.5
kindness	3	4.5	hug	1	1.5
nice	2	3.0	she's nice	1	1.5
awful lot of yelling	2	3.0	no response	3	4.6
daughter/son	2	3.0	sister	1	1.5
baby	1	1.5	don't know	4	6.2
spy	1	1.5	having fun	2	3.1
what my mother does for me	1	1.5	home	3	4.6
person	1	1.5	see her	1	1.5
housework	1	1.5	her name	3	4.6
friendship	1	1.5	she's getting married	1	1.5
wonderful	1	1.5	gave me birth	1	1.5
I was born from her stomach	1	1.5	ask my mother for money	1	1.5
behavior	1	1.5	cook	1	1.5
mean	1	1.5			

21. Question: What is the first thing that comes to your mind when I mention the word teacher?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
school	19	28.8	school	8	12.3
learning	6	9.1	learning	6	9.2
work	4	6.0	work	10	15.4
hate/dislike	2	3.0	don't like	1	1.5
just teacher	1	1.5	teacher	7	10.8
no response	1	1.5	no response	4	6.2
principal	1	1.5	principal	1	1.5
The responses below were given by only one group.					
mean/rotten	6	9.1	old hag	1	1.5
named specific teacher	3	4.5	friend	4	6.2
helps you	3	4.5	mother	3	4.6
ick	3	4.5	good	1	1.5
lady	2	3.0	later	1	1.5
student/pupil	2	3.0	don't know	6	9.2
math teacher/ algebra	2	3.0	dumb	1	1.5
get to work	1	1.5	students	1	1.5
barfing	1	1.5	girl	2	3.1
adult	1	1.5	man teacher	1	1.5
smart	1	1.5	ten	1	1.5
strict	1	1.5	nothing	1	1.5
homework	1	1.5	class	1	1.5
fun	1	1.5	substitute	1	1.5
nice	1	1.5	study	1	1.5
my teacher	1	1.5	teaching you	2	3.1
like a nun	1	1.5			

22. Question: A hat on a head is like ice cream on a _____?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
cone	48	72.7	cone	51	76.5
stick	12	18.2	stick	2	3.1
bed	2	3.0	bed	1	1.5

The responses below were given by only one group.

no response	1	1.5	truck	1	1.5
hat	1	1.5	bowl	1	1.5
table	1	1.5	hand	1	1.5
dish	1	1.5	man	3	4.6
			plate	3	4.6
			spoon	1	1.5
			cap	1	1.5

23. Question: Puppy goes with dog as kitten goes with _____?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
cat	61	92.4	cat	43	66.2
no response	1	1.5	no response	1	1.5
The responses below were given by only one group.					
mother	2	3.0	kitty/kitten	9	13.9
mouse	1	1.5	dog	2	3.1
lion	1	1.5	don't know	4	6.2
			mice	1	1.5
			mitten	2	3.1
			him	1	1.5
			won	2	3.1

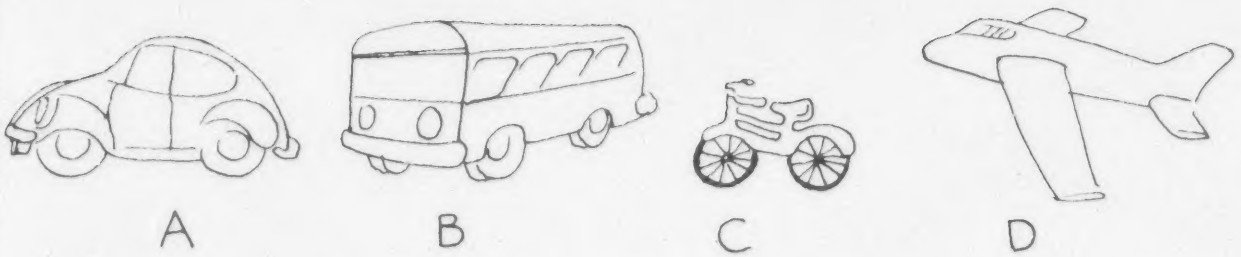
24. Question: White goes with black as day goes with _____?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
night	58	87.9	night	41	63.1
white	2	3.0	white	4	6.2
sun	1	1.5	sunshine	1	1.5
blue	1	1.5	blue	1	1.5
brown	1	1.5	brown	1	1.5
The responses below were given by only one group.					
light	1	1.5	day	1	1.5
green	1	1.5	no response	2	3.1
			morning	4	6.2
			dark	2	3.1
			don't know	4	6.2
			time	2	3.1
			days go by	1	1.5
			marry	1	1.5

25. Question*: What item does not belong in this picture?

Nonretarded			EMR		
Response	Frequency	%	Response	Frequency	%
D	40	60.6	D	39	60.0
C	26	39.4	C	23	35.4
The responses below were given by only one group.					
			all of it does	1	1.5
			B	1	1.5
			A	1	1.5

*This item was eliminated, since it was ambiguous.



Appendix B

Phase II Questionnaire and Instructions

Anticipation is a teacher-training game currently being developed. In this experimental version of the game, you are asked to guess the answers most commonly given by retarded and nonretarded children to the same series of questions.

The questions were originally given orally to groups of educable retarded and normal children who were between 11 and 14 years of age and attended the same inner city schools.

See if you can guess what their answers were. Read each question, determine which response was most frequently given by the children in each group, and check the appropriate line.

Please check only one answer for each group of children for each question.

1. Question: "What kind of a friend would a rock make?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. No response.	_____	_____
b. "A quiet one."	_____	_____
c. "A good one."	_____	_____
d. "No friend."	_____	_____
e. "Souvenir."	_____	_____
f. "Weighty."	_____	_____
g. "A bad one."	_____	_____
h. "Don't know."	_____	_____
i. "Another rock."	_____	_____
j. "A hard one."	_____	_____

2. Question: "How would you feel if you were a leaf on a maple tree?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Not so good."	_____	_____
b. "Good."	_____	_____
c. "Sad."	_____	_____
d. "Bad."	_____	_____
e. "Stupid/funny."	_____	_____
f. No response.	_____	_____
g. "Don't know."	_____	_____
h. "Just like other leaves."	_____	_____
i. "Green."	_____	_____
j. "Together."	_____	_____

3. Question: "How would you stop from melting if you were an ice cube?"

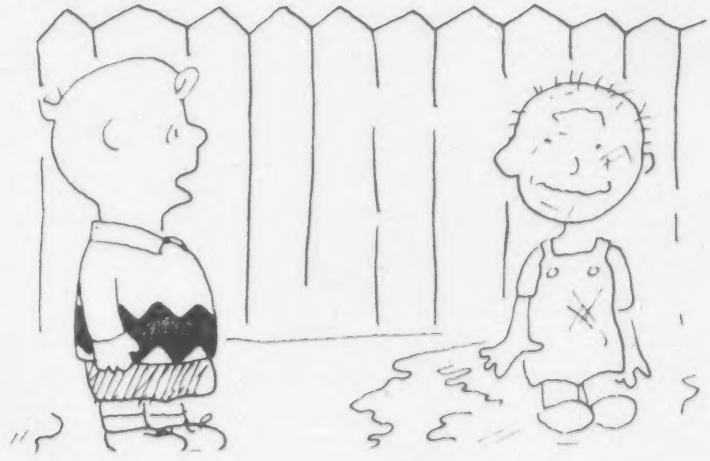
Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Go someplace where it's cold."		
b. "Stay cold."		
c. "Don't know."		
d. "Get out of the sun."		
e. "Get in freezer."		
f. "Go in the shade."		
g. "Melt."		
h. "Make a snowman."		
i. "I couldn't stop it."		
j. No response.		

4. Question: "What do you think Charlie Brown is saying to Pigpen?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Go take a bath."		
b. "Hi."		
c. "You're all wet."		
d. "Good grief."		
e. "Get off the sidwalk."		
f. "Pig."		
g. "You're a mess."		
h. "You're dirty."		
i. No response.		
j. "What's he doing in the mud puddle."		



5. Question: "Charlie Brown is making a wish. What do you think he is wishing for?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Sunshine/good weather."		
b. "A dog."		
c. "No snow."		
d. "A bike."		
e. No response.		
f. "Don't know."		
g. "A friend."		
h. "Peace."		
i. "Flowers."		
j. "About baseball."		

6. Question: "If you were locked in a bathroom without a key, how would you get out?"

	Retarded Child	Normal Child
a. "Bust a hole in the window."		
b. "Scream."		
c. "Call my family."		
d. "Kick the door down."		
e. No response.		
f. "Call the police."		
g. "Unlock the door."		
h. "Go out the window."		
i. "Take the hinges off."		
j. "Knock (pound) on the door."		

7. Question: "What would you do if you were in school and you were the first to find out that the school was on fire?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Call the fire dept."	_____	_____
b. "Call police."	_____	_____
c. "Try to find principal/teacher."	_____	_____
d. "Call for fire."	_____	_____
e. "Tell everybody."	_____	_____
f. "I'd be happy/ cheer."	_____	_____
g. "Let it burn."	_____	_____
h. "Get the fire extinguisher."	_____	_____
i. "Run out."	_____	_____
j. "Pull fire alarm."	_____	_____

8. Question: "What would you do if you wanted something which cost more than you had?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Save for it."	_____	_____
b. "Wouldn't buy it."	_____	_____
c. "Earn more money."	_____	_____
d. "Steal it."	_____	_____
e. "Ask a parent."	_____	_____
f. "Charge it."	_____	_____
g. "Spend it."	_____	_____
h. "Get more money."	_____	_____
i. "Get something else for less."	_____	_____
j. "Go home and get more money."	_____	_____

9. Question: "What's a whatchamacallit?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Anything."	_____	_____
b. "(Something/forget the name of/someone that you don't know the name)."	_____	_____
c. "No one don't know that."	_____	_____
d. "Something weird."	_____	_____
e. "Don't know."	_____	_____
f. "A whatchamacallit."	_____	_____
g. "A thing."	_____	_____
h. "A bird."	_____	_____
i. "Nothing."	_____	_____
j. No response.	_____	_____

10. Question: "What would you do if you wanted to get across a river and you couldn't swim?"

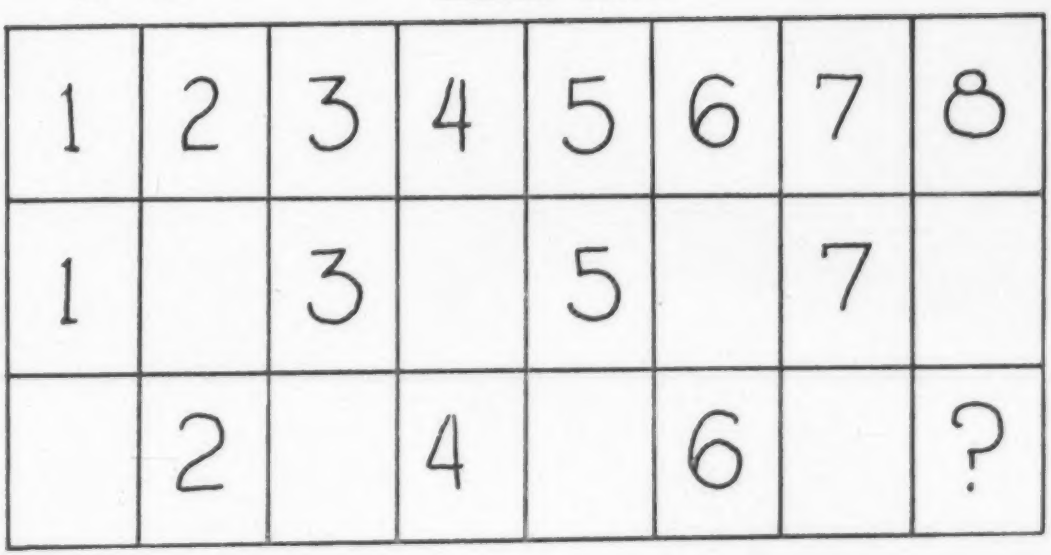
Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Take a boat."	_____	_____
b. "Wouldn't cross."	_____	_____
c. "Build a bridge."	_____	_____
d. "Scream for help."	_____	_____
e. "I'd cry."	_____	_____
f. "Climb a tree and jump."	_____	_____
g. "Walk."	_____	_____
h. "Drown."	_____	_____
i. "Run around it."	_____	_____
j. "Stay on the side."	_____	_____

11. Question: "What number should go in the box where the question mark is?"

Check the response most commonly given by each group of children:

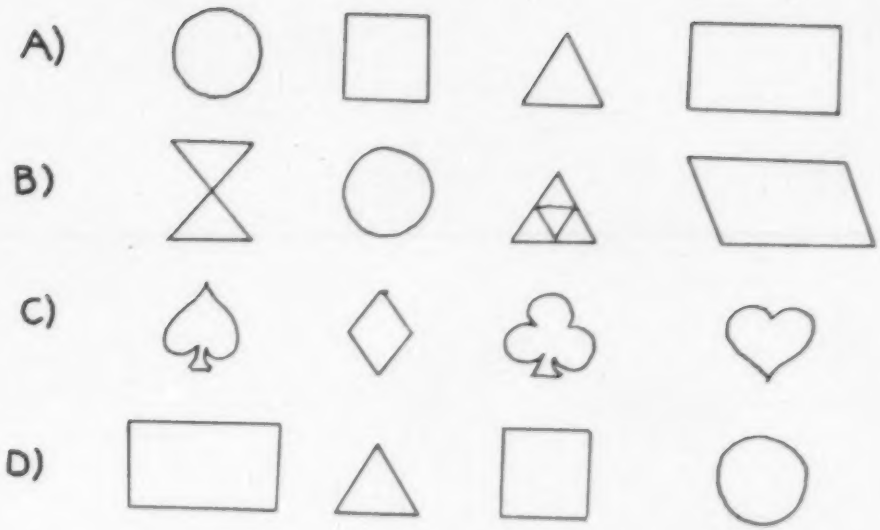
	Retarded Child	Normal Child
a. Eight	_____	_____
b. Five	_____	_____
c. Twelve	_____	_____
d. No response	_____	_____
e. One	_____	_____
f. Don't know	_____	_____
g. Nine	_____	_____
h. Two	_____	_____
i. Seven	_____	_____
j. Ten	_____	_____



12. Question: "Which of the following sets of figures are found on a deck of playing cards?"

Check the response most commonly given for each group of children:

	Retarded Child	Normal Child
a. "A"	_____	_____
b. "B"	_____	_____
c. "Don't know."	_____	_____
d. "C"	_____	_____
e. "D"	_____	_____
f. No response.	_____	_____
g. "Ace of spades."	_____	_____
h. "Diamonds."	_____	_____
i. "Hearts."	_____	_____
j. "Spades."	_____	_____



15. Question: "All boys will become men. John is a boy. What will John become?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "A teacher."		
b. "A father."		
c. "A truckdriver."		
d. "Old."		
e. No response.		
f. "A teenager."		
g. "Don't know."		
h. "A man."		
i. "A lady."		
j. "A major."		

14. Question: "All dogs bark. Charlie is a dog. What does Charlie do?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Howler."		
b. "Don't know."		
c. "Bark(s)."		
d. "Play baseball."		
e. No response.		
f. "Bite(s)."		
g. "Talk(s)."		
h. "Chases cats."		
i. "Chews bones."		
j. "Runs."		

15. Question: "What goes in the box?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Run."		
b. "Don't know."		
c. "Not."		
d. "Bun."		
e. "Hot."		
f. "Red."		
g. "Tan."		
h. No response.		
i. "Ton."		
j. "Rat."		

16. Question: "What item does not belong in this picture?"

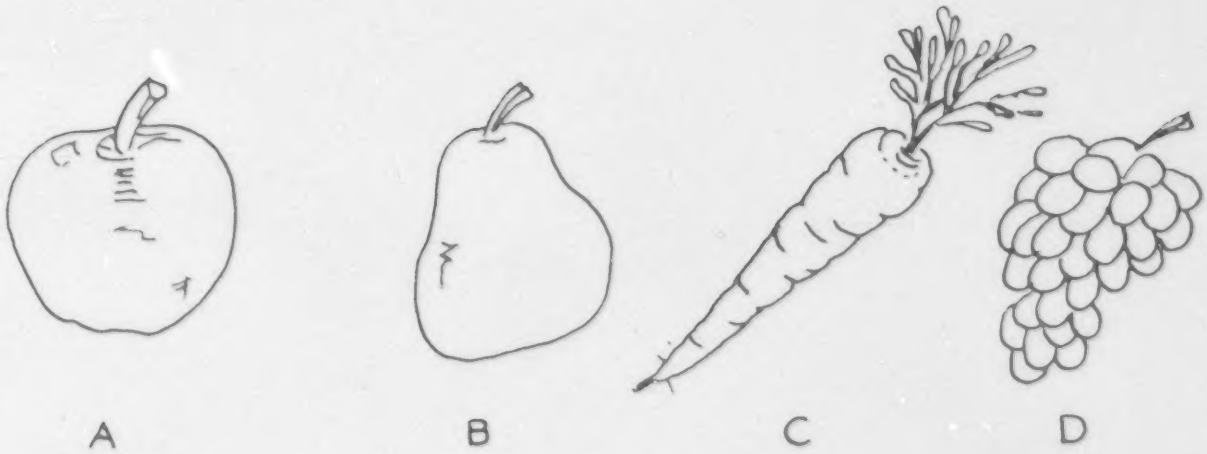
Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Pen."		
b. "Don't know."		
c. "B"		
d. "C"		
e. No response		
f. "All of it does."		
g. "A"		
h. "B + C"		
i. "The ink."		
j. "D"		

17. Question: "What item does not belong in this picture?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "All of them."		
b. "B"		
c. "Don't know."		
d. "D"		
e. "C"		
f. "A"		
g. No response.		



18. Question: "What is the difference between a cow and a bull?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. No response.		
b. "Bull is more dangerous."		
c. "Cows moo."		
d. "Cow is female, bull is male."		
e. "Bull has horns."		
f. "Cow eats grass."		
g. "Cow gives milk."		
h. "Don't know."		
i. "Bull is stronger/tougher."		
j. "They don't look the same."		

19. Question: "How are snow and rain alike?"

Check the responses most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Both water."	_____	_____
b. "When snow melts, it's like water."	_____	_____
c. "Both rain, but one freezes."	_____	_____
d. "Both are cold."	_____	_____
e. "Rain comes from snow."	_____	_____
f. "Both wet."	_____	_____
g. "Both fall."	_____	_____
h. "Rain's wet/snow's white/icy."	_____	_____
i. "Aren't alike."	_____	_____
j. "Don't know."	_____	_____

20. Question: "What is the first thing that comes to your mind when I mention the word mother?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Cook."	_____	_____
b. "Father."	_____	_____
c. "Baby."	_____	_____
d. "Home."	_____	_____
e. "Housework."	_____	_____
f. "Nice."	_____	_____
g. "Don't know."	_____	_____
h. "Mom/Mother."	_____	_____
i. "Kindness."	_____	_____
j. "Love."	_____	_____

21. Question: "What is the first thing that comes to your mind when I mention the word teacher?"

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Helps you."		
b. "Work."		
c. "Mean/rotten."		
d. "Don't know."		
e. "School."		
f. "Mother."		
g. "Learning."		
h. No response.		
i. "Teacher."		
j. "Adult."		

22. Question: "A hat on a head is like ice cream on a _____."

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Stick."		
b. No response.		
c. "Table."		
d. "Bed."		
e. "Dish."		
f. "Cone."		
g. "Hat."		
h. "Hand."		
i. "Don't know."		
j. "Men."		

23. Question: "Puppy goes with dog as kitten goes with _____."

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Animal."	_____	_____
b. No response.	_____	_____
c. "Mitten."	_____	_____
d. "Cat."	_____	_____
e. "Don't know."	_____	_____
f. "Mother."	_____	_____
g. "Lion."	_____	_____
h. "Mouse."	_____	_____
i. "Kitty/kitten."	_____	_____
j. "Pet."	_____	_____

24. Question: "White goes with black as day goes with _____."

Check the response most commonly given by each group of children:

	Retarded Child	Normal Child
a. "Night."	_____	_____
b. "Morning."	_____	_____
c. "White."	_____	_____
d. "Brown."	_____	_____
e. "Sun."	_____	_____
f. "Blue."	_____	_____
g. "Green."	_____	_____
h. "Don't know."	_____	_____
i. "Light."	_____	_____
j. "Dark."	_____	_____

APPENDIX C

Correlation Matrices used

For Factor Analyses

Correlation Matrix for the Responses to the Nonretarded Children Sample*

	1	2	3	4	5	6	7	8	9	10	11	12
1	.080											
2	-.103	.070										
3	.050	-.057	.100									
4	-.033	-.008	-.071	.077								
5	-.035	.087	-.043	-.016	.092							
6	-.035	.015	.133	.038	.023	.051						
7	.036	-.034	-.002	-.041	-.094	.058	.066					
8	-.010	-.030	-.154	.063	-.040	-.014	.042	.100				
9	-.059	.039	.008	.004	.025	-.075	-.057	-.035	.214			
10	.024	.036	-.054	.004	.094	-.022	-.043	.041	-.098	.069		
11	.034	.064	-.022	.036	.049	.043	.062	-.162	-.281	.099	.249	
12	.023	-.002	-.116	-.084	.034	-.031	.123	-.023	.048	-.011	.114	.153
13	-.033	-.065	.014	-.016	.003	-.015	.077	.043	-.169	.095	.097	.200
14	-.040	-.045	-.046	.013	.031	-.031	.044	-.080	.031	.011	.169	.239
15	-.005	.006	-.064	-.072	.049	.017	.044	.016	-.018	.036	.134	.113
16	-.175	.061	-.028	-.005	-.111	.030	.091	.030	.002	-.053	-.038	.105
17	.065	.056	-.072	-.084	.099	.059	.093	-.071	-.029	-.011	-.048	.060
18	.025	.005	-.044	.059	-.043	-.026	-.011	.040	.087	-.081	.032	-.011
19	-.043	.016	.003	-.156	.027	.039	-.021	.026	-.049	.115	.058	.103
20	.040	.030	.047	.032	.003	.066	.014	-.049	.104	-.061	.079	.007
21	-.044	-.053	.036	-.033	.097	-.025	.039	.082	-.127	-.033	-.051	.008
22	-.051	.135	.044	-.071	.100	.016	-.007	-.068	-.170	.032	.167	.069
23	-.033	-.071	-.073	.036	.077	.015	.109	.048	-.098	-.017	.202	.130
24	-.048	-.059	-.061	.098	.024	-.041	.032	-.016	.033	.017	.176	.198

*Note that this matrix includes squared multiple correlations in the diagonal.

Correlation Matrix for the Responses to the Nonretarded Children (Cont'd)

	13	14	15	16	17	18	19	20	21	22	23	24
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13	.228											
14	.343	.242										
15	.170	.099	.131									
16	.026	-.023	.123	.151								
17	.010	.086	.212	.160	.155							
18	.050	.043	-.032	-.039	-.108	.067						
19	.077	.030	.103	.141	.108	-.007	.098					
20	-.027	-.090	.024	-.022	.036	.101	.019	.066				
21	.150	.031	.080	.065	.092	.057	-.018	-.030	.097			
22	.052	.040	.111	.160	.072	-.036	-.022	-.024	.039	.127		
23	.148	.116	.077	.052	.055	.077	.022	-.027	-.002	.081	.128	
24	.212	.310	.182	.024	.058	.040	-.015	.021	.076	.048	.208	.193

Correlation Matrix for the Responses to the EMR Children Sample*

	1	2	3	4	5	6	7	8	9	10	11	12
1	.079											
2	.041	.089										
3	.141	.073	.119									
4	.100	.010	.109	.093								
5	.053	-.043	-.093	-.063	.086							
6	-.040	-.061	.018	-.043	.053	.074						
7	.021	-.056	.080	.012	-.015	.175	.121					
8	-.044	.168	-.014	.018	-.085	-.074	.048	.084				
9	-.031	-.005	-.037	.076	-.048	-.025	-.056	-.082	.084			
10	.021	-.013	.074	.095	-.109	.018	.151	.033	-.063	.210		
11	.081	.033	.167	.047	-.046	.082	.121	.008	-.036	.273	.252	
12	.020	.040	.117	-.019	-.079	.014	.214	-.039	-.123	.189	.293	.249
13	-.034	.073	.116	.046	-.122	.087	.122	.006	-.095	.249	.253	.114
14	.044	.022	.118	-.012	-.069	.102	.111	-.008	-.095	.277	.313	.193
15	-.037	.046	-.013	.043	-.110	.050	.045	.041	.104	.091	.023	.002
16	.046	-.075	.127	-.075	-.129	.056	.079	.002	-.124	.151	.232	.173
17	.031	-.070	.096	-.002	-.076	.063	.045	-.049	.038	.261	.194	.212
18	-.007	-.043	.031	.118	-.069	.054	-.002	.111	-.085	.049	-.070	-.003
19	.021	.008	-.016	-.076	.020	.020	.107	-.015	-.062	.065	.101	.228
20	.001	-.079	-.033	.019	-.064	.021	.036	-.045	-.039	.109	.074	.062
21	.100	-.017	-.127	-.045	.008	.055	.068	-.041	.011	-.036	-.008	-.049
22	.011	.090	.131	-.070	-.097	.050	.111	.020	-.028	.250	.253	.252
23	.085	-.007	.155	-.048	-.124	.092	.127	.038	-.012	.271	.337	.307
24	.073	-.031	.136	-.013	-.136	.066	.166	.008	-.039	.236	.196	.305

*Note that this matrix includes squared multiple correlations in the diagonal.

Correlation Matrix for the Responses to the EMR Children (Cont'd)

	13	14	15	16	17	18	19	20	21	22	23	24
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13	.326											
14	.449	.332										
15	.158	.167	.114									
16	.194	.249	-.021	.194								
17	.007	.152	.066	.182	.208							
18	.013	.050	.006	.044	-.000	.097						
19	.072	.058	-.069	.182	.152	.065	.116					
20	.125	.062	-.052	.146	.182	.011	.027	.089				
21	-.074	-.048	.011	-.027	.012	-.029	-.001	-.055	.069			
22	.278	.341	.078	.188	.205	.125	.099	.025	-.033	.269		
23	.340	.385	.198	.307	.273	-.009	.175	.135	-.122	.356	.417	
24	.304	.268	.092	.193	.214	-.046	.114	.079	-.057	.321	.456	.303